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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/627,107 | 07/22/2003 | Michael V. Nathal | LEW 17,093-2 | 2241 |

26311 7590 09/22/2004

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| EXAMINER | |
|---|---|
| ZIMMERMAN, JOHN J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1775 | |

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/627,107 | NATHAL ET AL. | |
| | Examiner | Art Unit | |
| | John J. Zimmerman | 1775 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20030722*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

# FIRST OFFICE ACTION

### *Information Disclosure Statement*

1. The Information Disclosure Statement filed with this application has been considered. An initialed form PTO-1449 is enclosed with this Office Action.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Regarding claim interpretation of the pending claims, the preamble term "rocket engine component" (e.g. claim 1, line 1; claim 8, line 1) has been given little weight since it does not add additional physical structure to the claimed product. See "Effect of Preamble", MPEP 2111.02. Claims that recite specific rocket engine structures (e.g. see claim 7) have been given weight for those specific structures recited. Regarding claim interpretation of the pending claims, the intended use "component for use and exposure within high heat flux and hot gas environments" (e.g. claim 9, line 1; claim 19, line 1) since all the applied references having the requisite NiAl materials would be capable of meeting the stated intended use. A recitation of the

intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Regarding the use of "predetermined" in the claims (e.g. see claim 1, line 6), the term "predetermined" does not add any physical structure or properties to the article or materials of the claims that would not be present if not determined beforehand. Therefore, little weight has been given to the term "predetermined" in the pending article claims. Regarding the "predetermined" properties recited in the claims (e.g. "environmental resistance", "thermal conductivity", "ductility", "strength", "toughness" etc. . .), all materials of the applied references have these properties. Regarding the filing date of the claimed subject matter, it is noted that all the pending claims of this application contain some limitations that were not present in the disclosure of the parent application. Therefore, the effective filing date of the claimed subject matter in the pending application is the filing date of the pending application (July 22, 2003) and not the filing date of the parent application (March 20, 2002).

4. Claims 1-3, 6, 8-16 and 19-20 and are rejected under 35 U.S.C. 102(b) as being anticipated by Miyamoto (U.S. Patent Application Publication 2002/0031603).

5. Miyamoto discloses a composite made from a layer of NiAl (2 mm thick) and a layer of stainless steel (2 mm thick) integrally bonded (e.g. see paragraphs [0129]-[0130]). The thickness of Miyamoto's NiAl layer would contribute structural integrity as a layer and also to the

structural integrity of the overall composite. The limitations "rocket engine component" and "component for use and exposure within high heat flux and hot gas environments" and their effects on the interpretation of the claims have been discussed above. In any event, Miyamoto discusses turbine blades as a use of the invention (e.g. see paragraphs [0001], [0102]) and high strength, heat resistance, wear and abrasion resistance (e.g. see paragraph [0127]) and therefore it is clear that the articles of Miyamoto would be capable of applicant's intended use. Barring evidence to the contrary, the thermal conductivity values, ductility, environmental resistance, strength, phase and toughness of the layers of Miyamoto are considered inherent to Miyamoto's disclosed NiAl and stainless steel materials.

6. Claims 1-2, 6, 8-16 and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Baranow (U.S. Patent 3,625,750).

7. Baranow discloses a turbine blade composite whose thickness appears to be half nickel aluminide and half nickel superalloy or cobalt superalloy (e.g. see Figures 6-7). The thickness of Baranow's NiAl layer would contribute structural integrity as a layer and also to the structural integrity of the overall composite. The limitations "rocket engine component" and "component for use and exposure within high heat flux and hot gas environments" and their effects on the interpretation of the claims have been discussed above. In any event, since Baranow's intended articles can be turbine components, it is clear that the articles of Baranow would be capable of applicant's intended use. Barring evidence to the contrary, the thermal conductivity values,

ductility, environmental resistance, strength, phase and toughness of the layers of Baranow are considered inherent to Baranow's disclosed NiAl and superalloy materials.

8. Claims 1-2, 6, 8-16 and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Miller (U.S. Patent 3,653,976).

9. Miller discloses a turbine blade composite wherein the thickness of a nickel aluminide component (e.g. numeral 36 in Figure 3) appears to be similar to the thickness of the adjoining nickel superalloy component (e.g. numeral 20 in Figure 3). Miller discloses that higher temperature composites can be made by applying nickel aluminide components to nickel base superalloy components (e.g. see column 1, lines 9-72). The thickness of Miller's NiAl component would have structural integrity since it is as thick as the walls of the turbine blade. The limitations "rocket engine component" and "component for use and exposure within high heat flux and hot gas environments" and their effects on the interpretation of the claims have been discussed above. In any event, since Miller's intended articles can be turbine components, it is clear that the articles of Miller would be capable of applicant's intended use. Barring evidence to the contrary, the thermal conductivity values, ductility, environmental resistance, strength, phase and toughness of the layers of Miller are considered inherent to Miller's disclosed NiAl and nickel superalloy materials (e.g. Inconel 713 - column 3, lines 38-64).

10. Claims 1-2, 6, 8-16 and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (U.S. Patent 5,348,446).

11. Lee discloses a turbine blade composite wherein the thickness of a nickel aluminide component (e.g. numeral 40 in Figure 2) appears to be similar to the thickness of the adjoining nickel superalloy component (e.g. numeral 28 in Figure 2). Lee discloses that the nickel aluminide component has much higher increase in heat conductivity over the nickel base superalloy components (e.g. see column 1, line 64 - column 2, line 14). The thickness of Lee's NiAl component would have structural integrity since it is as thick as the nickel based superalloy walls of the turbine blade. The limitations "rocket engine component" and "component for use and exposure within high heat flux and hot gas environments" and their effects on the interpretation of the claims have been discussed above. In any event, since Lee's intended articles can be turbine components, it is clear that the articles of Lee would be capable of applicant's intended use. Barring evidence to the contrary, the thermal conductivity values, ductility, environmental resistance, strength, phase and toughness of the layers of Lee are considered inherent to Lee's disclosed NiAl and nickel superalloy materials (e.g. N5, N6, Rene 80, Mar M; column 3, lines 4-11).

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto (U.S. Patent Application Publication 2002/0031603).

14. Miyamoto discloses a composite made from a layer of NiAl (2 mm thick) and a layer of stainless steel (2 mm thick) integrally bonded (e.g. see paragraphs [0129]-[0130]). The thickness of Miyamoto's NiAl layer would contribute structural integrity as a layer and also to the structural integrity of the overall composite. Miyamoto discusses the high strength, heat resistance, wear and abrasion resistance properties of his invention (e.g. see paragraph [0127]). Barring evidence to the contrary, the thermal conductivity values, ductility, environmental resistance, strength, phase and toughness of the layers of Miyamoto are considered inherent to Miyamoto's disclosed materials. Claim 7 differs from Miyamoto in that Miyamoto may not specifically list a "combustion chamber", "a throat" or "a nozzle" as articles for his invention. Miyamoto, however, does clearly disclose that his article is developed for high temperature and corrosion resistant articles and also does disclose suitability for turbine use and aerospace equipment (e.g. see paragraphs [0001]-[0002]). In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the invention of Miyamoto in any high temperature turbine or aerospace equipment uses (e.g. rocket engine components) where their high temperature and corrosion resistant properties would be understood to be useful by the one of ordinary skill in the art.

15. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto (U.S. Patent Application Publication 2002/0031603) in view of Barrett (U.S. Patent 4,610,736) or Liu (U.S. Patent 5,725,691).

16. Miyamoto discloses a composite made from a layer of NiAl (2 mm thick) and a layer of stainless steel (2 mm thick) integrally bonded (e.g. see paragraphs [0129]-[0130]). The thickness of Miyamoto's NiAl layer would contribute structural integrity as a layer and also to the overall composite. The limitations "rocket engine component" and "component for use and exposure within high heat flux and hot gas environments" and their effects on the interpretation of the claims have been discussed above. In any event, Miyamoto discusses turbine blades as a use of the invention (e.g. see paragraphs [0001], [0102]) and high strength, heat resistance, wear and abrasion resistance (e.g. see paragraph [0127]) and therefore it is clear that the articles of Miyamoto would be capable of applicant's intended use. Barring evidence to the contrary, the thermal conductivity values, ductility, environmental resistance, strength, phase and toughness of the layers of Miyamoto are considered inherent to Miyamoto's disclosed NiAl and stainless steel materials. Claims 4-5 and 17-18 differ from Miyamoto in that Miyamoto may not specifically disclose adding Zr to the NiAl material used in his invention. Miyamoto, however, does clearly disclose that his article is developed for high temperature and corrosion resistant articles and also does disclose suitability for turbine use and aerospace equipment (e.g. see paragraphs [0001]-[0002]). Barrett (e.g. see column 1, lines 35-41) and Liu (e.g. see paragraph spanning columns 4 and 5), however, disclose that it is known that minor additions of zirconium to nickel aluminide compositions improve the oxidation, strength and ductility properties of the nickel aluminide.

Liu suggests turbine engines and other high temperature uses for NiAl materials (e.g. see column 1, lines 27-35). In view of Barrett or Liu, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add minor amounts of zirconium to the nickel aluminide layer of Miyamoto because minor zirconium additions are shown to improve the oxidation, strength and ductility properties of nickel aluminides. Claim 7 differs from Miyamoto in that Miyamoto may not specifically list a "combustion chamber", "a throat" or "a nozzle" as articles for his invention. Miyamoto, however, does clearly disclose that his article is developed for high temperature and corrosion resistant articles and also does disclose suitability for turbine use and aerospace equipment (e.g. see paragraphs [0001]-[0002]). In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the invention of Miyamoto in any high temperature turbine or aerospace equipment uses (e.g. rocket engine components) where their high temperature and corrosion resistant properties would be understood to be useful by the one of ordinary skill in the art.

17. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (U.S. Patent 3,653,976) in view of Barrett (U.S. Patent 4,610,736) or Liu (U.S. Patent 5,725,691).

18. Miller discloses a turbine blade composite wherein the thickness of a nickel aluminide component (e.g. numeral 36 in Figure 3) appears to be similar to the thickness of the adjoining nickel superalloy component (e.g. numeral 20 in Figure 3). Miller discloses that higher temperature composites can be made by applying nickel aluminide components to nickel base superalloy components (e.g. see column 1, lines 9-72). The thickness of Miller's NiAl

component would have structural integrity since it is as thick as the walls of the nickel base superalloy parts of the turbine blade. The limitations "rocket engine component" and "component for use and exposure within high heat flux and hot gas environments" and their effects on the interpretation of the claims have been discussed above. In any event, since Miller's intended articles can be turbine components, it is clear that the articles of Miller would be capable of applicant's intended use. Barring evidence to the contrary, the thermal conductivity values, ductility, environmental resistance, strength, phase and toughness of the layers of Miller are considered inherent to Miller's disclosed NiAl and nickel superalloy materials (e.g. Inconel 713 - column 3, lines 38-64). Claims 4-5 and 17-18 differ from Miller in that Miller may not specifically disclose adding Zr to the NiAl material used in his invention. Miller, however, does clearly disclose that his article is developed to withstand the high temperatures used in turbine equipment (e.g. see column 1, lines 9-37). Barrett (e.g. see column 1, lines 35-41) and Liu (e.g. see paragraph spanning columns 4 and 5) disclose that it is known that minor additions of zirconium to nickel aluminide compositions improve the oxidation, strength and ductility properties of the nickel aluminide. Liu suggests turbine engines and other high temperature uses for NiAl materials (e.g. see column 1, lines 27-35). In view of Barrett or Liu, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add minor amounts of zirconium to the nickel aluminide component of Miller because minor zirconium additions are shown to improve the oxidation, strength and ductility properties of nickel aluminides. Claim 7 differs from Miller in that Miller may not specifically list a "combustion chamber", "a throat" or "a nozzle" as articles for his invention. Miller, however, does clearly disclose that his article is developed for high temperature and corrosion resistant articles. In

view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the invention of Miller in any high temperature uses (e.g. rocket engine components) where their high temperature and corrosion resistant properties would be understood to be useful by the one of ordinary skill in the art.

19. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. Patent 5,348,446) in view of Barrett (U.S. Patent 4,610,736) or Liu (U.S. Patent 5,725,691).

20. Lee discloses a turbine blade composite wherein the thickness of a nickel aluminide component (e.g. numeral 40 in Figure 2) appears to be similar to the thickness of the adjoining nickel superalloy component (e.g. numeral 28 in Figure 2). Lee discloses that the nickel aluminide component has much higher increase in heat conductivity over the nickel base superalloy components (e.g. see column 1, line 64 - column 2, line 14). The thickness of Lee's NiAl component would have structural integrity since it is as thick as the nickel based superalloy walls of the turbine blade. The limitations "rocket engine component" and "component for use and exposure within high heat flux and hot gas environments" and their effects on the interpretation of the claims have been discussed above. In any event, since Lee's intended articles can be turbine components, it is clear that the articles of Lee would be capable of applicant's intended use. Barring evidence to the contrary, the thermal conductivity values, ductility, environmental resistance, strength, phase and toughness of the layers of Lee are considered inherent to Lee's disclosed NiAl and nickel superalloy materials (e.g. N5, N6, Rene 80, Mar M; column 3, lines 4-11). Claims 4-5 and 17-18 differ from Lee in that Lee may not

specifically disclose adding Zr to the NiAl material used in his invention. Lee, however, does clearly disclose that his article is developed to withstand the high temperatures used in turbine equipment. Barrett (e.g. see column 1, lines 35-41) and Liu (e.g. see paragraph spanning columns 4 and 5) disclose that it is known that minor additions of zirconium to nickel aluminide compositions improve the oxidation, strength and ductility properties of the nickel aluminide. Liu suggests turbine engines and other high temperature uses for NiAl materials (e.g. see column 1, lines 27-35). In view of Barrett or Liu, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add minor amounts of zirconium to the nickel aluminide component of Lee because minor zirconium additions are shown to improve the oxidation, strength and ductility properties of nickel aluminides. Claim 7 differs from Lee in that Lee may not specifically list a "combustion chamber", "a throat" or "a nozzle" as articles for his invention. Lee, however, does clearly disclose that his article is developed for high temperature and corrosion resistant articles. In view of the above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the invention of Lee in any high temperature uses (e.g. rocket engine components) where their high temperature and corrosion resistant properties would be understood to be useful by the one of ordinary skill in the art.

***Conclusion***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These additionally cited references serve to further establish the level of ordinary skill in the art at the time the invention was made.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Zimmerman whose telephone number is (571) 272-1547. The examiner can normally be reached on 8:30am-5:00pm, M-F. Supervisor Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John J. Zimmerman
Primary Examiner
Art Unit 1775

jjz
September 17, 2004